

# Erratum on Voting Theory for Democracy

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<http://www.dataweb.nl/~cool/Papers/VTFD/Index.html>

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## ■ Introduction

Colignatus (2011a) “Voting Theory for Democracy” introduces the “Borda Fixed Point” method and has a “Theorem” on page 77 that BordaFP would always identify the Majority Plurality winner, i.e. who has more than 50% over all alternatives.

Markus Schulze (2011) presented a counterexample.

Hence the “Theorem” collapses. I thank Markus Schulze for pointing this out.

In retrospect it actually is obvious. I must have not been thinking right. One of the reasons to introduce the Borda method is to present an alternative to a majority plurality winner. Say one group of 51 people prefers A while an opposition of 49 people dislikes it very much. They might settle on a compromise candidate, perhaps even preference B of the opposition if that is not disliked much by the group of 51. Overall, if the plain majority winner drops from the Borda selection, it need not become a fixed point.

This correction does not affect VTFD as such. Some statements will have to be adapted and it seems useful to include a test in some routines whether the Majority Plurality winner is found or not. It will be included in the next update.

Schulze (2011) also has other comments on VTFD but most I don’t agree with. My Response to this is in Colignatus (2011b).

Below reproduces the counterexample.

## ■ Schulze’s counterexample

51 afbcde

49 cdefba

Needs ["Economics`Pack`"]



ResetAll

Economics[Voting]

SetVotingProblem[{51, 49}, {a, b, c, d, e},

{ToPref[a > f > b > c > d > e], ToPref[c > d > e > f > b > a]}]

{Number of Voters → 2, Number of items → 6, Votes are nonnegative and add up to 1 → True,

Preferences fit the numbers of Voters and Items → True, Type of scale → Ordinal,

Preferences give a proper ordering → True, Preferences add up to → {21}, Items → {a, b, c, d, e, f}, Votes →  $\left\{ \frac{51}{100}, \frac{49}{100} \right\}$

BordaAnalysis[]

{Select → c, BordaFPQ → {False}, WeightTotal →  $\left\{ \frac{71}{20}, \frac{151}{50}, \frac{447}{100}, \frac{347}{100}, \frac{247}{100}, \frac{201}{50} \right\}$ , Position → ( 3 ), Ordering →

$\left. \begin{array}{l} \frac{247}{100} \\ \frac{151}{50} \\ \frac{347}{100} \\ \frac{71}{20} \\ \frac{201}{50} \\ \frac{447}{100} \end{array} \right\} \begin{array}{l} e \\ b \\ d \\ a \\ f \\ c \end{array}$

**BordaFP[]**

BordaFP::chg: Borda gave  $\{c\}$ , the selected Fixed Point is  $\{f\}$

$f$

**WinnerOfPair[c, f]**

$f$

**Plurality[]**

$$\left\{ \text{Sum} \rightarrow \begin{pmatrix} a & \frac{51}{100} \\ c & \frac{49}{100} \end{pmatrix}, \text{Ordering} \rightarrow \begin{pmatrix} \frac{49}{100} & c \\ \frac{51}{100} & a \end{pmatrix}, \text{Max} \rightarrow \left\{ a, \frac{51}{100} \right\}, \text{Select} \rightarrow a \right\}$$

## ■ References

Colignatus (2011a), “Voting Theory for Democracy”, 3rd edition, T. Cool (Consultancy and Econometrics), <http://www.dataweb.nl/~cool/Papers/VTFD/Index.html>

Colignatus (2011b), “Response to a review of Voting Theory for Democracy, in the light of the economic crisis and the role of mathematicians”, <http://mpira.ub.uni-muenchen.de/34615/>

Schulze, M. (2011), Schulze, M. (2011), “Review “Voting Theory for Democracy””, Voting Matters, Issue 29, October 2011, <http://www.votingmatters.org.uk/ISSUE29/INDEX.HTM> and <http://www.votingmatters.org.uk/ISSUE29/I29P5.pdf>